# Non-Contact RFID Locking Safety Switches

# MGL-P, MGL-M, MGL-SS Operating Instructions

**MGL-P**

PLASTIC

**MGL-M**

DIE CAST METAL

**MGL-SS**

STAINLESS STEEL

## IMPORTANT NOTE:

**Read and understand these instructions before installing, operating, or maintaining this equipment.**
The product is designed to be a component of a customised safety orientated control system. It is the responsibility of the user to ensure the correct overall functionality of its systems and machines. IDEM, its subsidiaries and affiliates, are not in a position to guarantee all of the characteristics of a given system or product not designed by IDEM.

## DESCRIPTION:

The MGL range of Non-Contact RFID Coded switches has been developed to provide and maintain a high level of functional safety whilst providing a reliable magnetic door interlock.
Coding is achieved by using magnetic and RFID techniques and both of these principles need to be satisfied for the switch to operate safely.
The MGL range will connect to the majority of popular standard safety relays to achieve door interlocking up to PLe/Category 4 to ISO13849-1.
Offered in Stainless Steel 316, high specification robust Plastic or in Die Cast Metal housings the MGL switches can used in almost any environments including high pressure cleaning following contact with foreign particles.
The Stainless Steel 316 version of the MGL incorporates a Stainless Steel magnet and has an IP69K ingress protection rating making it suitable for CIP and SIP processes.

## APPLICATION:

MGL RFID Coded Non-Contact Safety Switches with integral holding magnet have been designed to interlock hinged or sliding guard doors. They are specifically advantageous when:

a) high level anti-tamper is required
b) high hygiene requirements exist e.g. food industry hose down
c) long mechanical life is required (no moving parts)
d) there is a requirement to hold a guard closed

When used in combination with a Dual Channel Safety Relay or Controller they can be used to provide door interlock protection up to Category 4 and PLe to ISO13849-1.

## OPERATION:

All RFID Coded Non-Contact Safety Switches are designed to conform to EN60947-5-3 and be used as directed by ISO14119, EN ISO12100 and EN60204-1. They have coded RFID sensing which provides a wide (>10mm) sensing distance and provides a high tolerance to misalignment after sensing. They can operate in extreme environments of temperature and moisture. The switches are provided factory coded either uniquely or by series master code.

## IMPORTANT:

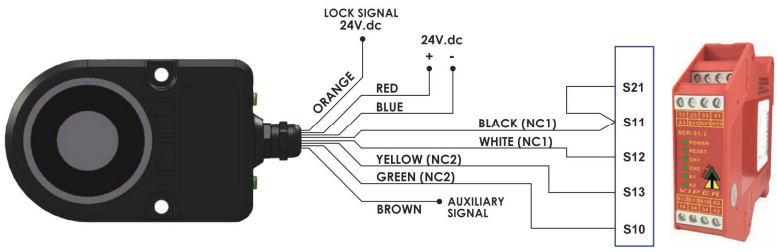
**The guard locking function is <u>Power ON applied, Power OFF released</u> as described in ISO14119. This locking function needs to be risk assessed against any hazard to an operator in the case of machine overrun after release or loss of power.**
**The Risk Assessment for the particular application should include the risk of spare actuators. Spare actuators should not be readily available and must be securely controlled. Record any RFID codes as required by factory rules or with reference to any risk assessment for the particular application and user location.**

## INSTALLATION:

Installation of all RFID Coded Non-Contact Safety Switches must be in accordance with a risk assessment for the individual application.
The use of a Safety Relay is required for monitoring RFID Coded switches. These relays monitor 2 redundant circuits as per ISO13849-1 for up to PLe/Category 4 protection.
RFID Coded Non-Contact Safety Switches are designed to operate with most Dual Channel Safety Relays to satisfy EN60947-5-3.
M5 mounting bolts must be used to fix the switches. Tightening torque for mounting bolts to ensure reliable fixing is 1.0 Nm. Always mount on to Non Ferrous materials.
Do not mount adjacent switches or actuators closer than 100mm. To achieve nominal holding force ensure face to face alignment of magnetic parts.
After installation always check each switch function by opening and closing each guard individually in turn and ensuring that the Green LED on the switch and the LEDs on the Safety Relay or Controller are illuminated when the switch is closed and are extinguished when the switch is open. Check that the machine stops and cannot be re-started when each switch is open.
**Note:** The safety outputs will only close when the actuator is in place and the lock magnet is energised. Forcing open of the lock will cause the safety outputs to open.

**IMPORTANT:** Reset procedure for flashing Yellow LED error:
1 Ensure LOCK APPLIED SIGNAL is OFF.
2 Apply LOCK SIGNAL and wait until Yellow LED becomes steady. Switch is now reset.
3) Outputs will turn ON if guard is closed and aligned and the LOCK SIGNAL is applied.

**CONNECTION EXAMPLE: Dual circuit to a SCR-31-i Safety Relay**




## FEATURES:

HEAVY DUTY: (F1 max.) 1100N S/Steel, 1500N Plastic and Die Cast Metal
MEDIUM DUTY: (F1 max.) 600N S/Steel, 1000N Plastic and Die Cast Metal

2NC Safety Outputs (Door closed – Lock energised)
1NO Auxiliary Output for indication of door open

No moving parts – high switch life and provides resistance to shock and vibration.

Magnetisation holding technique acts as a magnetic latch before and after unlocking.
Prevents unwanted opening of guards due to vibration either after unlocking or re-closing.

| | | |
|---|---|---|
| Latch retain force after removing lock signal: | HEAVY DUTY 175N. max. | MEDIUM DUTY: 120N. max. |
| Latch retain after re-closing: | HEAVY DUTY 100N. max. | MEDIUM DUTY: 80N. max. |

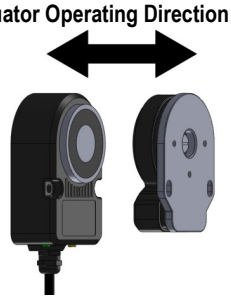
## MAINTENANCE / SAFETY CHECKS:

Monthly: Check alignment of actuator and look for signs of mechanical damage to the switch, actuator or cable.
Replace any switch displaying damage. **These requirements form part of the product warranty.**

The safety functions and mechanics must be tested regularly. For applications were infrequent guard access is foreseeable, the system must have a manual function test to detect a possible accumulation of faults. At least once per month for PLe Cat3/4 or once per year for PLd Cat3 (ISO13849-1). Where possible it is recommended that the control system of the machine demands and monitors these tests, and stops or prevents the machine from starting if the test is not done, (ISO14119).
Check that the machine stops and cannot be re-started when each switch is open.

# Non-Contact RFID Locking Safety Switches

**Actuator Operating Direction:**



## LED Operation and Switch Status Indication:

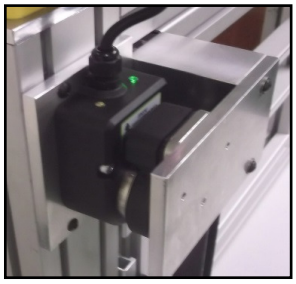
The MGL switch uses 2 LEDs to indicate all the different possible switch states.

The LEDs are in a clearly visible location at either side of the cable exit point.

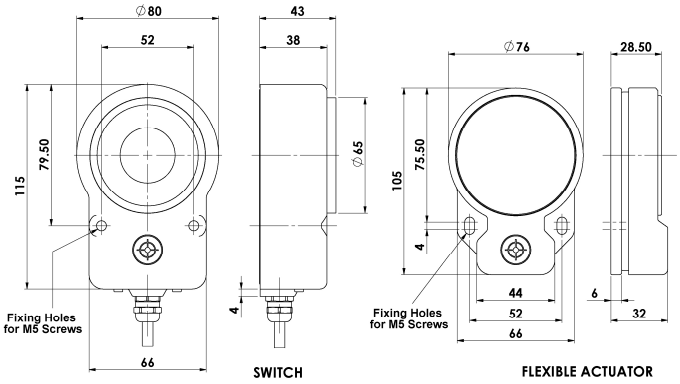
| Switch Status | Guard | Green LED | Yellow LED |
|---|---|---|---|
| Locked | Closed | Steady | Off |
| Solenoid Power OFF (unlocked) | Closed | Flashing | Off |
| Guard Open | Open | Off | Steady |
| Door Forced Open | Open | Off | Flashing |

MGL shown in OPEN position.
Steady Yellow LED indication.

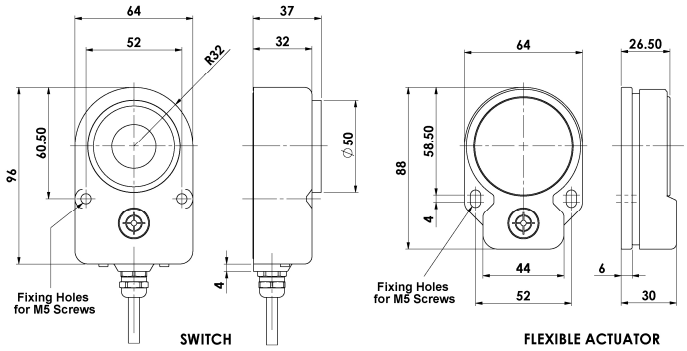
MGL shown in CLOSED position, lock energised.
Steady Green LED indication.



## MGL-1 Switch Dimensions (mm) (Heavy Duty)




## MGL-2 Switch Dimensions (mm) (Medium Duty)




| | |
|---|---|
| **Standards:** | ISO14119 EN60947-5-3 EN60204-1 ISO13849-1 UL508 |
| Dielectric Withstand: | 250V.ac |
| Insulation Resistance: | 100 Mohms |
| Switching Distance: | Sao 1mm Close<br>Sar 10mm Open |
| Tolerance to Misalignment: | 5mm in any direction from a gap of 5mm |
| Switching frequency: | 1.0 Hz maximum) |
| Approach speed: | 200mm/m to 1000mm/s |
| Body material: | MGL-*P = Plastic<br>MGL-*M = Die-Cast Metal<br>MGL-*SS = Stainless Steel 316 |
| Temperature Range: | -25C to +40C |
| Enclosure Protection: | IP67/IP69K (Stainless Steel)<br>(QC versions IP67 for connector) |
| Cable Type: | PVC 8 core 6mm OD |
| Mounting Bolts: | 2 x M5 Tightening torque 1.0 Nm |
| Mounting Position: | Any |
| Power Supply: | +24Vdc ± 10% (SELV / PELV) |
| Maximum Switched Current (outputs): | 200mA (Minimum internal resistance 8.5 Ohms) |

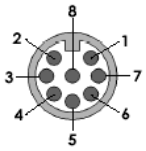
**Characteristic Data according to EN ISO13849-1:**

| | |
|---|---|
| Performance Level | e If both channels are used in combination with a SIL3/PLe control device |
| Category | Cat4 |
| MTTFd | 1100a |
| Diagnostic Coverage DC | 99% (high) |
| Number of operating days per year: | $d_{op}$ = 365d |
| Number of operating hours per day: | $h_{op}$ = 24h |
| B10d: | Not mechanical parts implemented |

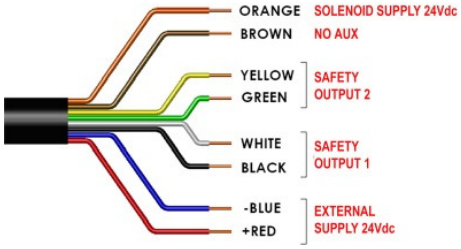
When the product is used deviant from these assumptions (different load, operating frequency,

**INFORMATION WITH REGARD TO UL508**
Type 1 Enclosures.
Maximum temperature 40°C. Maximum output 24V.dc 200mA.
Powered by Class 2 or equivalent.
**WARNING:** Hot surface – risk of burn if used at ambient temperature of +40C degrees.
(Affix a warning label to the switch).

## Connection Colours




Pin View from Switch




| Quick Connect (QC) 250mm (10") M12 8-Way Male Plug | Flying Lead Conductor Colours | Function | Power Ratings |
|---|---|---|---|
| 3 | Blue | Supply 0Vdc | |
| 2 | Red | Supply 24Vdc | 50mA max. |
| 8 | Orange | Lock Applied (24Vdc) | 500mA max. |
| 7 | Black | Safety Output 1 | 200mA |
| 1 | White | Safety Output 1 | (max. switching) |
| 4 | Yellow | Safety Output 2 | 200mA |
| 6 | Green | Safety Output 2 | (max. switching) |
| 5 | Brown | Auxiliary Signal | +24Vdc |

Female leads:

To ensure the flying lead colours are matched and maintain IP67 the recommended female leads are:

Idem Part: 140101 8 way M12 female lead 5m. Length
Idem Part: 140102 8 way M12 female lead 10m. Length

**WARNING: DO NOT DEFEAT, TAMPER, OR BYPASS THE SAFETY FUNCTION. FAILURE TO DO SO CAN RESULT IN DEATH OR SERIOUS INJURY.**

**AVERTISSMENT: NE PAS DESACTIVER, MODIFIER, RETIRER, OU CONTOURNER CETI INTERVERROUILLAGE IL PEUT EN RESULTER DES BLESSURES GRAVES DU PERSONNEL UTILISATEUR.**

**Original Instructions.**

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